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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/509,472      | 04/21/2000  | MASARU MITSUI        | 105875              | 9665             |

25944            7590            04/03/2002

OLIFF & BERRIDGE, PLC  
P.O. BOX 19928  
ALEXANDRIA, VA 22320

[REDACTED] EXAMINER

CLARKE, YVETTE M

| ART UNIT | PAPER NUMBER |
|----------|--------------|
| 1752     | 14           |

DATE MAILED: 04/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

MF-14

|                              |                      |                     |
|------------------------------|----------------------|---------------------|
| <b>Office Action Summary</b> | <b>Applicant No.</b> | <b>Applicant(s)</b> |
|                              | 09/509,472           | MITSUI ET AL.       |
|                              | <b>Examiner</b>      | <b>Art Unit</b>     |
|                              | Yvette M Clarke      | 1752                |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply****A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extension of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on 22 January 2002 and 04 March 2002.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-8, 10-20, 22-28 and 30 is/are rejected.
- 7) Claim(s) 9, 21 and 29 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____ .                                   |

## DETAILED ACTION

This is written in reference to application number 09/509472 filed on April 21, 2000.

### ***Response to Amendment***

1. The amendments filed on January 22, 2002 and March 4, 2002 have been entered and fully considered.
2. The translation of the Japanese priority document is sufficient support for the amendment to the specification and to instant claim 6. The rejections of claim 6 under 35 USC 112, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs are hereby withdrawn.
3. The amendment to the claims is sufficient to overcome the rejection of claims 1-26 under 35 USC 112, 2<sup>nd</sup> paragraph.
4. Claims 1-30 are currently pending.

### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

**The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.**
6. Claim 11 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear to the examiner if the closed language of the claim was intended to exclude the presence of helium as set forth in the independent or if it was only intended to narrow the choice of metal material to chromium. It is also unclear to the examiner if the term "chromium" in the said claims refers to chromium compounds as taught by the instant specification or if it refers to pure chromium. The examiner has interpreted the claims to be further limiting of the

metal material to be chromium compounds as taught by the specification. The examiner has found no support for a pure chromium thin film.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

**(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.**

8. Claims 1-8, 10-20, 22-28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita (US 5738959A). Miyashita teaches a method for producing the halftone phase shift photomask blank comprising at least one film layer composed mainly of chromium compound containing at least fluorine atoms. The said film is superior in the transmittance in the short wavelength region compared to conventional films (c. 3, l. 55-67). The chromium containing film is sputtered onto a substrate in an atmosphere, which contains only a sputter gas such as argon, neon, helium or nitrogen or a combination of a sputter gas and a fluorine source gas. If necessary, the atmosphere may be mixed with an oxygen, nitrogen or carbon source gas (c. 4, l. 49-65). The method of producing a chromium compound containing fluorine atoms according to the taught invention is a thin-film forming method in which chromium is evaporated in a vacuum chamber and deposited on a transparent substrate for a photomask (c. 5, l. 42-46). When the said chromium film is used as a single layer, it can be patterned by approximately the same method as that used for conventional

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photomask (c. 6, l. 40-55). Miyashita teaches that an additional layer of a material selected from the group consisting of chromium oxide, chromium oxide nitride and chromium oxide carbide nitride can be coated onto the said chromium layer as a light-blocking layer to adjust the transmittance within the range in which the phase inversion function is not impaired (c. 4, l. 26-31; c. 11, l. 24-29). It is the examiner's position that the said additional layer constitutes an antireflective film as claimed in present claim 4. The film of the taught invention can be used as halftone phase shift film if the transmittance for exposure light falls within the range of from 1-50%. It is the examiner position that if 1-50% of the light is transmitted, then 50-99% of the light is non-transmitted, thereby meeting the claims limitations of having a shading function. Example 2 discloses a process wherein the formed blank is provided with a resist pattern of an organic material formed by conventional photolithography to obtain a halftone phase shift photomask. The formed photomask has a transmittance of 5% and was practical in all requirements such as dimensional accuracy of the etched portions, film thickness and transmittance distribution (c. 14, l. 40-64). It would have been obvious to one of ordinary skill in the art based on the teachings of Miyashita to develop a mask comprising a chromium thin film which is sputtered in an atmosphere comprising a combination of helium and fluorine source mixed with small amounts of oxygen, nitrogen and carbon dioxide gas. It would have been obvious to one of ordinary skill in the art, light of the teachings of Miyashita to adjust the parameters of pressure, sputter power, and atmosphere gas composition prior to sputtering in order to alter the refractive index and extinction coefficient of the resulting film (c. 4, l. 60-65).

***R sponse to Arguments***

9. Applicant's arguments filed on January 22, 2002 have been fully considered but they are not persuasive. Applicants argue that the prior art fails to teach a means or reason to reduce film stress. Applicants further argue that the reference fails to teach that helium is present in the thin film. The examiner respectfully disagrees. The examiner is of the position that the presence of helium would inherently reduce film stress. The claims as written do not require a specific amount of reduction. Therefore, a minimal presence will serve to reduce the film stress by a minimum amount. The examiner reminds the applicant that the motivation of the prior art does not have to be that of the applicants. Miyashita teaches that fluorine atoms are introduced into the chromium thin film by sputtering in an atmosphere comprising a sputter gas and a fluorine source (c. 4, l. 49-65). It is the examiner's position that when helium is present in the said atmosphere, it would be introduced into the thin film, as would fluorine. A trace amount of helium is sufficient to meet the limitations of the instant claims. Applicant has provided no evidence that the material of the prior art does not contain helium. Furthermore, there is no evidence that the chromium film of the instant application has a stress less than that of the prior art. The examiner maintains her rejection over the cited prior art of Miyashita.

10. The rejection of the claims over Babich (US 5830322 A) is hereby withdrawn. Babich fails to teach a thin film comprising a metal material as set forth in the instant claims.

***Allowable Subj ct Matter***

11. Claims 9, 21 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: review of the prior art failed to teach and/or suggest the use of a nitride film containing nitrogen and the same metal contained in the thin film layer formed between the transparent substrate and the claimed thin film.

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Yoshida (US 6,285,424 B1), which teaches a black mask, color filter and liquid crystal display.
- Fujikawa et al. (US 5,592,317 A) which teaches chromium blanks for forming black matrix-screen and color filter for liquid crystal display.
- Shinkai et al. (US 4,720,442 A) which teaches a photomask blank and photomask.
- Matsui et al. (US 4,563,407 A) which teaches a photomask blank comprising a shading layer having a variable etch rate.
- Nagarekawa et al. (US 4,530,891 A) which teaches a photomask blank for use in lithography including a modified chromium compound.
- Kaneki (US 4,363,846 A), which teaches a photomask and photomask blank.

***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

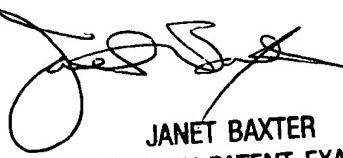
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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

15. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette M Clarke whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 7-5:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on 703-308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193.

ymc   
March 28, 2002

  
JANET BAXTER  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700